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cc: F.D. Dryden/File

Project #FS155  
Austin, MN  
February 21, 1997

W. DION - CO  
M. SLETTE - CO  
D. SCHEIDT - CO  
T. HADDEN - OKC  
D. WHITE - OKC  
R. ALBERS - OKC

RE: Browning tests: Heat and Control oven: conversation with Doug Kozenski and James Padilla

**Recommendations:**

1. Reduce fat to 25 % to 28 %
2. Overmix meat 10 minutes. (may change texture)
3. Use STPP - may change texture (with 2 minute re-mix).
4. Test radiant tube at Heat & Control in tandem with impingement oven.
5. Test Different Sugars:
  - a. Fructose - Brown color
  - b. Sucrose - Tan color
  - c. Dextrose - Golden Tan color
  - d. Corn Syrup Solids - Reddish Brown color
  - e. Brown Sugar

**6. Initial Impingement Oven Parameters**

	<u>Infeed</u>	<u>Nozzle Height - 2</u>	<u>Exit</u>
Top Fan	75		75
Temp.	400		500
Humidity	40		40
Bottom Fan	70		70

Dwell @ 1.5

If more browning is needed, increase temperature to 450°F.

Infeed temp could go to 500°F and Exit temp to 550°F. maximum.



pjh (11756)

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U-06863**

PTO-004134

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WB-000080

## Unitherm Operating Conditions

### General Notes

2/25/97

Phyllis

- 1) Testing and evaluation showed that we obtained the best color with Top air in the first zone and bottom air in the last 2 zones.
- 2) To get good color on sides, we had to only put 4 pieces wide on Unitherm belt. Some pieces were up to 8" wide at widest point.
- 3) We were able to load the belt on 10" centers.
- 4) Unitherm put a new belt on unit that is heavier material and 1/2" wide. This should help give better color on bottom as was shown from testing.
- 5) We observed darker product on the side closest to the fan. Unitherm said they would adjust the angle of the baffle to improve uniformity from side to side.
- 6) Final testing showed that the first zone temperature dropped when product was put into it. Unitherm said that will be corrected when all heaters are hooked up.

PTO-004135

# Unitherm Operating Conditions

2/24/97

Phil W. Wren

Product 44 Mesquite Smoked Breast

A) Smoke Drench  
4 Wide

Solution: 1 Part Super  
1 Part 10DC  
1 Part Water

Time 45 sec

B) Unitherm Settings

1) Speed setting 63

Dwell Time 10 Min 45 Sec

2) Temperature Settings

Zone 1 572°F

Top Air

Zone 2 670°F

Bottom Air

Zone 3 670°F

Bottom Air

C) Average Treatment Loss 2.94%

D) Evaluation

Color close to target

Piece on back side on target color

Bottom too dark - Should be better with new belt

# Unitherm Operating Conditions

2/25/97

Product # 5-7934 Breast

A) Smoke Drench  
4 Wic

Solution: 2 Part Smoke 10  
1 Part Water

Time: 20 sec (4 zones on)

B) Unitherm Setting ~~22~~ Dwell Time 9 min 30 sec

1) Speed setting 72

2) Temperature Setting

Zone 1 570°F

Top Air

Zone 2 670°F

Bottom Air

Zone 3 670°F

Bottom Air

C) Average treatment Wt Loss 3.0%

D) Evaluation

Slower speed gave slightly darker color

Very uniform attractive color

Fan side piece is darker

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# Unitherm Operating Conditions

2/24/97  
Ph. 1 Wen

Product 302-304 Hickory

A) Smoke Drench  
4 Wile

Solution: 2 Parts Smoke 100  
1 Part water

Time 45 sec

B) Unitherm Settings

~~2~~

Dwell 9 Min 30 Sec

1) Speed setting 72

2) Temperature Setting

Zone 1 570°F

Top Air

Zone 2 670°F

Bottom Air

Zone 3 670°F

Bottom Air

C) Average Treatment Loss

~~2.8%~~

2.8%

D) Evaluation:

Color little darker than  
Back side pieces darker

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2/25/97

## Unitherm Operating Conditions

Product 204 and 304 \*

A) Smoke Drench Solution 2 Parts Smoke 100  
1 Part water

B) Unitherm Settings

1) Speed setting 90 Dwell time 7 min 48 sec

2) Temperature settings

To be determined  
Air flow has changed

C) Average treatment Wt Loss 1.7%

D) Evaluation - Run 5 Wt Loss

Good color on top, sides too light  
Poor uniformity

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WB-000084

\* These tests were run the first day  
with original air directions. Would need  
to retine settings with recent data.

# Unitherm Operating Conditions

2/24/97

Phil Weimer

Product 76 Breast

A) Smoke Drench  
4 Wide

Solution: Maltose 1 Part  
Water 1 Part

Time: 45 sec

B) Unitherm Settings

1) Speed setting: 72

Dwell Time 9 min 27.

2) Temperature Setting:

Zone 1 570°F

Top Air

Zone 2 670°F

Bottom Air

Zone 3 670°F

Bottom Air

3) Average <sup>treatment</sup>~~cooking~~ Loss: 3.16%

4) Gave target color

Color more uniform than present system

Golden brown with black highlights

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WB-000085

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TO: Springfield Management (Jefferson St.)

FROM: Tony Muller

Date: February 11, 1997

RE: DATA SUMMARY CONDUCTED AT UNITHERM ON THE RAPID FLOW OVEN

The following summarizes the data recorded on the last day (January 30, 1997) of testing at Unitherm on the rapid flow oven. Air flow through each of the zones that gave the best color uniformity from top to bottom within a piece and across the belt is as follows: ZONE 1:UP ZONE 2:DOWN ZONE 3:DOWN. Products located closest to the air fans were consistently darker which Dave Howard from Unitherm will address prior to oven installation.

PRODUCT CODE	TYPE	SMOKE	PARAMETERS SMOKE DILUTION TIME	OVEN SETTINGS FREQ. 1 2 3	YD (HOT)
57934	HK	100	2:1 70s	76 570 670 670	97.48
57934	HK	100	2:1 70s	72 570 670 670	97.01
50204	HK	100	2:1 70s	72 570 670 670	97.18
NOTE: COLOR OF FINISHED PRODUCT WAS CLOSE TO TARGET					
50302	HK	100	2:1 70s	72 570 670 670	98.02
NOTE: COLOR LIGHTER THAN THE CONTROL					
50044	MQ	10DC	1:1 45s	72 570 670 670	97.24
50044	MQ	10DC	2:1 45s	72 570 670 670	97.27
NOTE: OVERALL, COLOR TOO LIGHT					
50044	MQ	10DC	2:1 45s	63 570 670 670	96.71
NOTE: LIGHT SIDE OF THE TARGETED COLOR					
50044	MQ	10DC/SSP	1:1:1 45s	63 570 670 670	96.68
NOTE: COLOR CLOSER TO TARGET, BOTTOM TOO DARK					
50044	MQ	10DC/SSP	1:1:1 45s	63 572 670 670	96.97
50044	MQ	10DC/SSP	1:1:1 45s	63 572 670 670	97.15
NOTE: 1 ZONE CAPACITY IN OVEN, COLOR CLOSER TO TARGET					
50076	MAILLOSE		1:1 45s	72 572 670 670	96.84
NOTE: HIT TARGET COLOR					

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PTO-004141

#### FOOTNOTES

1. Hickory smoke was applied through the drench applicator designed to run simultaneously with the rapid flow oven. The drench applicator performed to our expectations. Mesquite smoke and maillose were hand dipped for 45 seconds due to time constraints.
2. Correlating times for frequency given on table.  
76=9m 0s / 72=9m 30s/ 63=10m 45s
3. Oven temperatures are in degree Fahrenheit.
4. Hot cook yield is based upon the average of four pieces setting side by side when transported through the oven. Chilled cook yield was not determined due to logistics.

# Proposed RWO Ham Cycle

Time	DB	WB	% RH
20	140	120	55
20	150	140	75
90	150	125	Wood Smoke 48
45	—	160	100
45	—	170	100
—	—	180	TO IT 148°F 100

DAVE:

please review proposed RWO HAM cycle —  
I think the first two steps & the step  
after the smoke cycle are too high in  
humidity —

I'm attaching the cycle I've been using  
on the small C-81's to stretch —  
the 1st 4 <sup>steps</sup> ~~cycles~~ would apply to  
the RWO cycle for comparison

*[Signature]*

PTO-004143

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MP360.10

March 6, 1997

SMIL Cure 810 Heat Process - 170°F Internal Temperature

TIME (MINUTES)	DAY BULB °F	WET BULB °F	RH	SMOKE	DRAVES
30	150	110	28	OFF	Auto
30	150	120	40	OFF	Auto
120*	150	125	48	ON	Auto
<del>120</del>	160	140	57	OFF	Auto
60	170	150	59	OFF	Auto
60	0	175	100	OFF	STEAM COOL
**	0	185	100	OFF	STEAM COOL

\* Start smoke 30 minutes into the cycle

\*\* Steam cook / Draves closed with supply fan on to 170°F

30 150 X 120

30 150 X 125

90 150 X 120 W/SMK Art Goebel

30 160 X 120

160 STEAM COOL → 138-140° internal

170 STEAM COOL → 148-150° internal

PTO-004144

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U-06895

UNITHERM FOOD SYSTEMS INC.  
1108 WEST HARTFORD AVE.  
PONCA CITY, OKLAHOMA 74601  
TELEPHONE: 405-762-0197  
FAX: 405-762-0199  
E-MAIL: unitherm@pcok.com



A WORLD OF STAINLESS STEEL PRODUCTS

March 10, 1997

Mr. Bob Wood  
JENNIE-O FOODS, INC.  
2505 Willmar Ave. South West  
Willmar, MN 56201

*Via Fax # 320-231-7177*

Dear Bob:

I was sorry that we were not able to make more immediate progress on Friday. I hope the following adequately reflects the project and our observations.

- 1) During the site visit and subsequent meeting, interest was expressed in developing a replacement for your current netting process. We believe that we have a solution for this. It would cost a budget price of \$78,000. If you are interested in pursuing this, we would ask that you look at your yearly cost of netting. This will determine the return on investment and whether the equipment is worth inventing. If you would wish to proceed, we will generate the legal paperwork that allows us to disclose the process. Please let us know.
- 2) Bag Stripper We acknowledge that you are keen to purchase this unit. Believe me, it was hard to walk away from the order.

If we are to move the blades to the side, it creates the following engineering problems: The resistance from the blades will make the product stall and the conveyor will not create the friction to drive it through. This can be resolved by putting a flight on the belt; however, the flight will then drive the product into the air inflator so that it becomes jammed. These are the initial problems. It might be that an indexing system works better.

The existing unit works well and costs \$38,000. However, Jeff's observation is correct, and the blade would be better placed on the sides. If we are to make this unit, the cost would be \$54,000. Delivery would be 16-20 weeks. We would need an adequate supply of product for testing, and would require your personnel to visit site here prior to delivery to agree performance.

U-02331

PTO-004145

Bob Wood

Page 2

March 10, 1997

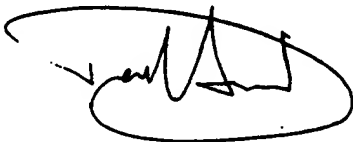
- 3) We observed at Montevideo product being cut by hand into two pieces. We believe that a previous "chicken splitter" we have built will perform this job faster and more accurately. The unit would cost \$28,000.
- 4) We also noticed that slicing product was being "docked" prior to slicing, so that the slicing yield is nominally 90 percent. Press Towers would give a yield of 98 percent. This equipment is available for testing.
- 5) Aqua Flow You expressed interest in testing this unit at your facility. I can confirm that it will be available at the beginning of April. We would ask that you advise us of the foot print, weight, and volume per hour of product you would like to pasteurize. This will allow us to size a machine and quote you for it. By doing so, we are seeking to establish the criteria by which the process can succeed and develop into an order for UNITHERM.
6. We can confirm the following prices for your in-line smoking process:

A. Bag Stripper	\$ 38,000
B. Purge Removal	\$ 49,000
C. Smoke Dip	\$ 27,500
D. RapidFlow 3-zone	\$525,000
C.I.P., if desired	\$ 58,000
E. Impingement Chiller	\$210,000

You mentioned that the smoke line was unlikely to proceed in 1997. We are currently building lines at the moment, and would be happy to receive you as our guest to view the equipment. The offer remains to visit the U.K., where we could extend the visit to include your viewing four or five RapidFlow lines in operation, if this would help.

We did not discuss in any detail Radio Frequency Cooking. I did get the impression that your team may have been confused as to its acceptability in the food industry. R.F. is a dielectric energy, similar to microwave. R. F. has been widely used in the bakery industry in the U.S. for the last 10 years. What's new is the migration and innovation of this technology to meat.

Regards,



David Howard  
President

DH578W

U-02332

PTO-004146

UNITHERM Food Systems, Inc.										Date: 3/10/97
Cooking Trial Data										
Test #	Belt Speed	Cook Time	Product: TURKEY BREAST w/NET MARKS		Start Weight	Cooked Weight	Yield	Internal Temp. F.	Supplied By: PLAINVILLE	R marks
			Temperatures C.	Zone 1 Zone 2						
#1	30.06'	8.5 MIN.	350°		6.720	6.585	98%	38°F		
#2	23.04	10 MIN.	350°		7.395	7.225	97%			
#3	15.60	14 MIN.	350°		6.780	6.555	96%			
#4		20 MIN.	350°		6.570	6.295	95%			
#5		24 MIN.	350°		7.060	6.695	94%			
#6		28 MIN.	350°		6.945	6.515	93%			
NOTES										
#7	30 MIN. 350° / 6.495 5.515 91%									
#8	32 MIN. 350° / 6.635 5.985 90%									
#3										
#4										
#5										
#6										

U-01390

PTO-004147

UNITHERM FOOD SYSTEMS, INC.  
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A WORLD OF STAINLESS STEEL PRODUCTS

## FAX TRANSMITTAL

DATE: 3/11/97

TO: MARCUS

COMPANY: RAINVILLE FARMS

FAX NUMBER:

FROM: JIM WADE

TOTAL PAGES: 2

### MESSAGE:

MARCUS -

PLEASE SEE PAGE 2  
FOR YOUR COOK/WEIGHTS INFO. COPY OF MY ORIG.  
- AS YOU CAN SEE, THE LONGER COOK  
TIME CERTAINLY AFFECTS YIELDS...

IF YOU WERE OPEN TO THE IDEA, A VERY  
MILD SOLUTION OF MAILDSE - MIXED @ 5% OR  
10% WOULD GIVE YOU A VERY NICE COLOR, AND  
MUCH HIGHER YIELD. I DO, HOWEVER  
RESPECT WHAT YOU ARE TRYING TO ACHIEVE.

I DO HOPE THE SAMPLES, WITH THIS  
INFORMATION, DO GIVE YOU THE INFO YOU  
WERE LOOKING FOR.

DID YOU LIKE WHAT YOU'VE SEEN?  
PLEASE LET ME KNOW, AND THANKS FOR  
THE OPPORTUNITY TO HELP -

U-01391

PTO-004148



UNITHERM Food Systems, Inc.										Date:	15-30-97
Cooking Trial Data											
Test #	Belt Speed	Cook Time	Product:		Start Weight	Cooked Weight	Yield	Internal Temp. F.	Remarks	Supplied By:	FARM AND FOODS
			Temperatures C.								
			Zone 1	Zone 2							
#1	10 MIN		500	500							
#2	10 MIN		500	500							
#3	NO 3 - SMOKE										
#4	NO 4 10 MIN DRY										
#5											
#6											
NOTES											
#1											
#2											
#3											
#4											
#5											
#6											

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U-8203

PTO-004154

UNITHERM FOOD SYSTEMS, INC.  
1108 WEST HARTFORD AVE.  
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FAX: 405-762-0199  
E-MAIL: [unitherm@pcok.com](mailto:unitherm@pcok.com)



A WORLD OF STAINLESS STEEL PRODUCTS

June 2, 1997

Mr. Rick Denzel  
Mr. Kent Gross  
EXCEL CORP.  
Ft. Branch, IN

*Via Fax # 812-753-2014*

Dear Sirs:

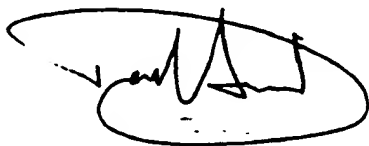
The settings for the RapidFlow are as follows:

Zone 1:	(Infeed)	Temperature	450° F.	Steam On
Zone 2:		Temperature	650° F.	
Belt Speed:	1 minute	50 seconds		

The concentration to atomize - Corn Syrup and Caramel (or Mailose):

65 percent	Hot Water
30 percent	Corn Syrup
5 percent	Caramel or Mailose

Regards,



David Howard  
President

DNH24EC

U-00088

PTO-004155

UNITHERM Food Systems, Inc.										Date: 6-17-97
Cooking Trial Data					Product:					Supplied By: <i>Jenni Osterda</i>
Test #	Belt Speed	Cook Time	Temperatures C.		Start Weight	Cooked Weight	Yield	Internal Temp. F.	Remarks	
			Zone 1	Zone 2						
#1	36.01	9 min	560	650					SKIN ON - select-mes 100% emulsion - 24 P-RED. emulsion (skinless) 1 2/221 8 AM P	
#2	36.01	9 min	560	650					SKIN ON - GET 24-P 30%	
#3	36.01	9 min	560	650	10.390				RED ARROW - <del>24-P 30%</del>	
#4	36.01	9 min	560	650	10.28			OK	SKINLESS - NET	
#5					9.265	9.1			RED ARROW - POLY-24	
#6					9.230	9.040				
NOTES										
#1	33% Smoke 62% H <sub>2</sub> O									
#2										
#3										
#4										
#5										
#6										

U-05699